

WHAT IS CLAIMED IS:

1. A method of molding a part, comprising:

preparing a base mold;

placing a layer of fiberglass in the base mold;

5 forming a closed mold by sealing a soft tool to the base mold over the layer of fiberglass, wherein a vacuum channel is defined between the soft tool and the base mold;

applying a vacuum to the vacuum channel at a vacuum port thus creating a vacuum within the mold;

10 injecting a resin into the mold to infuse the fiberglass layer with resin; and

curing the resin infused fiberglass to form a part.

2. The method of claim 1, further comprising applying a gel coat to the mold prior to placing the layer of fiberglass in the base mold.

15 3. The method of claim 1, wherein the step of placing the layer of fiberglass in the base mold includes laying plural layers of fiberglass sheet material in the base mold.

4. The method of claim 1, further comprising placing support members in the base mold prior to applying the soft tool to the base mold.

20 5. The method of claim 1, wherein the step of injecting the resin includes injecting the resin at a single injection port in the soft tool.

6. The method of claim 1, wherein the step of injecting the resin includes injecting the resin at plural injection ports.

25 7. The method of claim 1, wherein the step of injecting the resin includes injecting the resin at an injection port spaced from the vacuum port.

8. The method of claim 1, wherein the vacuum channel circumscribes an outer edge of the base mold and the step of injecting the resin includes injecting the resin at a location spaced inwardly of the vacuum channel.

30 9. The method of claim 1, further comprising the step of applying at least one vacuum conduit to the base mold forming the closed mold, wherein the at least one vacuum conduit communicates with the vacuum channel and the fiberglass layer.

10. A soft tool for use in a closed mold, comprising:  
a sheet having an outer edge;

a seal formed at the outer edge configured for sealing engagement with a base mold;

5 a vacuum channel formed at the outer edge and spaced inwardly of the seal, the vacuum channel being defined by at least one wall spaced inwardly of the seal; and

at least one injection port disposed in the sheet.

11. The soft tool of claim 10, wherein the vacuum channel includes flexible side walls.

10 12. The soft tool of claim 10, wherein the vacuum channel is defined by the seal and the inwardly spaced wall.

13. The soft tool of claim 10, wherein the vacuum channel is defined by two spaced walls.

14. The soft tool of claim 13, wherein the vacuum channel includes a third wall disposed between the two spaced walls.

15 15. The soft tool of claim 10, wherein the at least one wall of the vacuum channel has a generally V-shaped cross-section.

16. The soft tool of claim 10, further comprising a vacuum port formed in the vacuum channel for attachment to a vacuum source.

20 17. The soft tool of claim 10, wherein the sheet is formed of flexible, resilient material.

18. The soft tool of claim 10, wherein the seal is a flange that protrudes outwardly from the sheet.

19. The soft tool of claim 10, wherein the injection port has a fastening formation.

25 20. The soft tool of claim 10, wherein the injection port includes a hollow collar secured to the sheet.

21. An injection head for ejecting a flowable substance, comprising:  
a housing including a chamber defined within at least a portion of the housing, the chamber having a supply port, a purge port, and an outlet;  
30 an actuator connected to the housing; and  
an injection spindle connected to the actuator and slidably retained within the chamber between an ejection position and a deployed position.

22. The injection head of claim 21, further comprising a fastener disposed at the outlet of the chamber.

23. The injection head of claim 22, wherein the fastener includes a threaded collar.

5 24. The injection head of claim 22, wherein the fastener includes a locking groove and flange.

25. The injection head of claim 21, further comprising a tube retained within the chamber in the housing, wherein the tube is formed of low friction material.

10 26. The injection head of claim 21, wherein the actuator includes a solenoid is disposed at one end of the housing opposed to the outlet, the supply port is disposed adjacent the outlet, and the purge port is disposed between the supply port and the solenoid.

27. The injection head of claim 21, wherein the supply port is disposed between the purge port and the outlet.

15 28. The injection head of claim 21, wherein the injection spindle has a variable cross-section to form passages between the chamber and the spindle.

29. The injection head of claim 21, further comprising a removable plug releasably retained within the chamber.

20 30. The injection head of claim 29, wherein the removable plug is disposed at an end of the injection spindle when the injection spindle is in the ejection position.

31. The injection head of claim 30, wherein the injection spindle has an end shaped to complement the removable plug.

25 32. The injection head of claim 30, wherein the plug is slidably retained within the chamber and is positioned at the outlet when the injection spindle is in the deployed position.

33. The injection head of claim 29, wherein the removable plug is a sphere.

34. The injection head of claim 29, wherein the removable plug is a disk shaped object.

30 35. The injection head of claim 21, further comprising a seal disposed at the outlet of the chamber.

36. The injection head of claim 21, further comprising a tube retained within the chamber having an corresponding supply port and purge port, wherein the

tube includes a edge at the outlet with an engaging formation and a seal retained within the engaging formation.

37. The injection head of claim 21, wherein the injection spindle has a low friction surface.

5        38. A molding system comprising:

            a base mold;

            a soft tool formed as a sheet having an outer edge, a seal formed at the outer edge and connected in sealing engagement with a base mold to form a closed mold, a vacuum channel formed at the outer edge of the sheet and spaced inwardly of 10 the seal, and at least one injection port disposed in the sheet; and

            an injection head releasably connected to the injection port for injecting a flowable substance into the closed mold, including a housing with a chamber defined therein having a supply port, a purge port, and an outlet, an actuator connected to the housing, and an injection spindle connected to the actuator and 15 slidably retained within the chamber between an ejection position and a deployed position.